

# Advanced Master's Degree Clinical Hematology



## Advanced Master's Degree Clinical Hematology

- » Modality: online
- » Duration: 2 years
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/in/medicine/advanced-master-degree/advanced-master-degree-clinical-hematology](http://www.techtute.com/in/medicine/advanced-master-degree/advanced-master-degree-clinical-hematology)

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# 01 Introduction

The large number of recent advances in hematology, one of today's most complex health disciplines, require specialists to update their knowledge immediately. Therefore, through this program, the physician will be able to integrate the latest scientific findings in this discipline into their professional practice, delving into aspects such as medullary aplasia, the interpretation of prothrombin, thrombin and activated thromboplastin times or intraoperative blood-saving strategies. All this, through a 100% online methodology with which you will be able to combine your daily work commitments with your studies, since you will be able to choose the time and place to study.





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*This program will allow you to integrate the latest advances in hematology into your daily work, delving into issues such as von Willebrand disease or Waldenström's macroglobulinemia"*

In recent years, hematology has undergone major transformations that have led to the incorporation of numerous new procedures, diagnostic techniques and scientific discoveries. As such, the discipline has recently undergone remarkable changes, driven by the continuous advances made by researchers and specialists. For this reason, physicians whose careers are related to this field need to get up to speed immediately, a goal that they will be able to achieve thanks to this program.

This Advanced Master's Degree in Clinical Hematology has brought together all the innovations in this area, integrating in a single degree not only aspects such as the latest developments in the physiology of hemostasis, but also other fields such as transfusion medicine. Accordingly, this program is the most complete and up-to-date on the market, and will delve into other relevant issues such as plasma cell dyscrasias, oncohematological diseases such as leukemias and lymphomas or the latest advances in transfusion in pediatric patients.

Thanks to this degree, the specialist will be able to update their knowledge through an online teaching system that will make it very easy to study, since it will not subject them to rigid schedules or uncomfortable commutes. Additionally, students will be supported by a highly prestigious teaching staff in the field of hematology, who will provide them with all the latest developments in the discipline using the best teaching resources, presented in various multimedia formats.

This **Advanced Master's Degree in Clinical Hematology** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ Practical cases presented by experts in medicine
- ♦ The graphic, schematic, and eminently practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ Special emphasis on innovative methodologies in Clinical Hematology
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*You will be able to learn the most recent developments in plasma cell dyscrasias through a 100% online teaching methodology"*



*No rigid schedules or uncomfortable commutes. Update your knowledge in hematology from your home or office, at your own pace, whenever and however you want"*

Its teaching staff includes professionals from the field of hematology, who contribute to this program the experience of their work, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide an immersive learning experience designed to train for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise during the academic year. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Throughout the program, you will receive guidance from a highly regarded faculty in the field of hematology.*

*You will have state-of-the-art multimedia resources at your disposal: case studies, procedural videos, master classes, interactive summaries.*



# 02 Objectives

The main objective of this Advanced Master's Degree in Clinical Hematology is to provide specialists with the most advanced knowledge in this complex medical area. To achieve this goal, this program offers its students completely up-to-date content, including the latest scientific theories in all relevant areas of the discipline, a teaching staff of great international prestige, and a learning system that will be fully adapted to their personal and professional circumstances.







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*You will be able to update your knowledge immediately in areas such as spinal cord disorders or hemophilia diagnostic processes”*



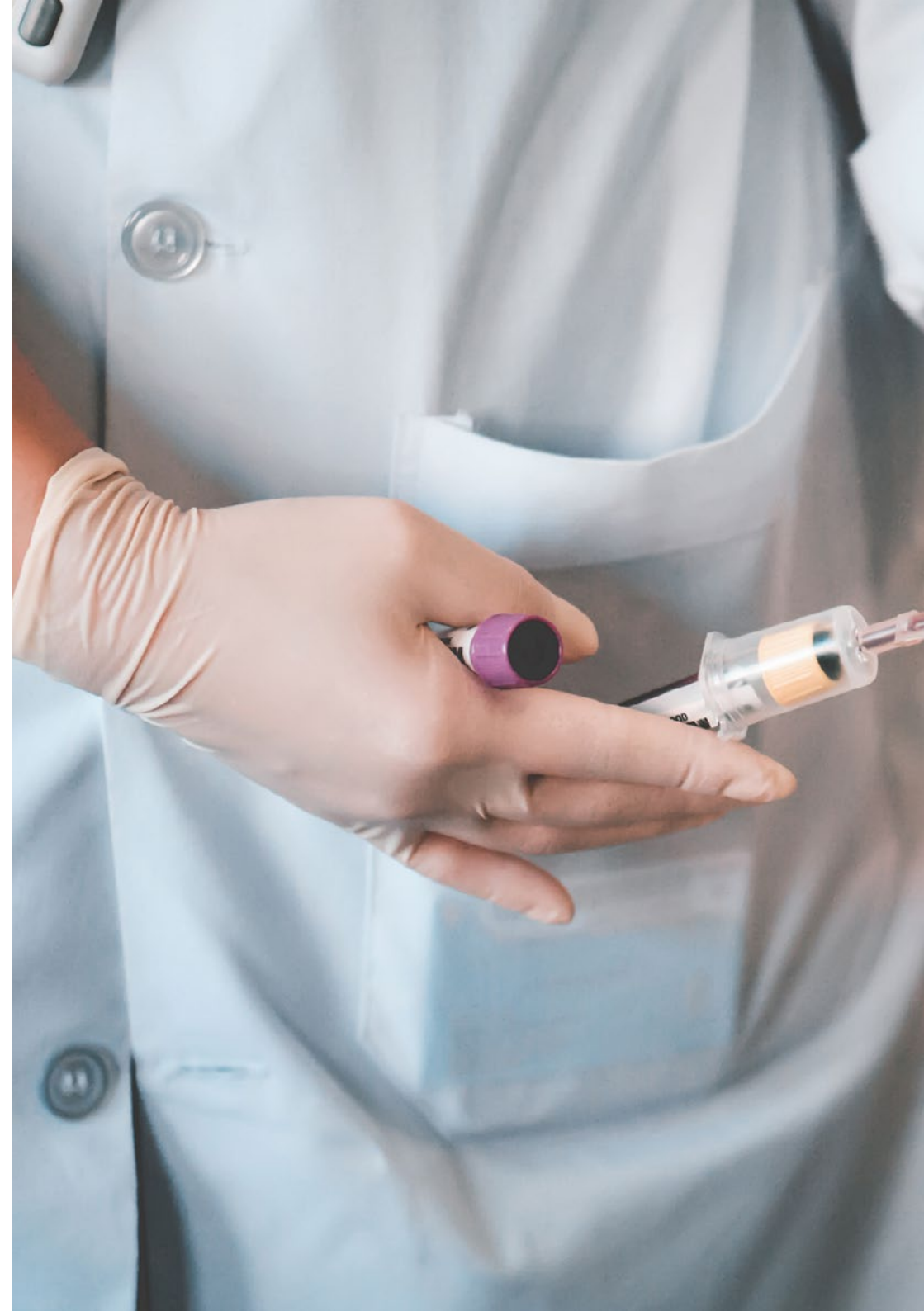
## General objectives

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- ◆ Provide the specialist with the latest scientific evidence on the use of diagnostic and therapeutic tools for hematologic diseases
- ◆ Develop comprehensive prevention, diagnosis, treatment and rehabilitation actions, with a multidisciplinary and integrative approach that facilitates medical care with the highest quality standards for the control and follow-up of hematological patients
- ◆ Know everything about the process of blood donation and blood components
- ◆ Understand hemovigilance as a transversal process involving the entire transfusion chain, from donor to patient



*The most recent advances  
in endocrinology are within  
your reach thanks to this  
Advanced Master's Degree"*





## Specific objectives

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### **Module 1. Recent Discoveries in Hematopoiesis, Cytogenetics, and Immunophenotyping in Hematology**

- ◆ Get up to date in the aspects of Pathological Anatomy, Biochemistry, Immunology, Genetics, and Molecular Biology of hematologic diseases

### **Module 2. Update on the Importance of the Laboratory in Hematology and Hemotherapy**

- ◆ Get up to date in molecular and cellular biology, providing general concepts of modern molecular terminology, essential for future medical practice, both at clinical and diagnostic laboratory levels
- ◆ Explain the latest advances introduced in clinical practice on hematopoietic progenitor cell transplantation
- ◆ Emphasize the role of the rational use of diagnostic technologies when studying these patients

### **Module 3. Update on Anemia**

- ◆ Obtain the most advanced knowledge of anemias

### **Module 4. Scientific Developments in Spinal Cord Disorders**

- ◆ Incorporate into professional practice the latest scientific developments in this type of disorders

### **Module 5. Current Events in Hemostasis Physiology**

- ◆ Explain the complex pathophysiologic and etiopathogenic interrelationships in the mechanisms of hematologic disease onset
- ◆ Explain the pathophysiological and pathogenic interrelationships between each of these diseases in morbidity and mortality

#### **Module 6. Update on Coagulation, Thrombosis, and Fibrinolysis Tests**

- ♦ Take an in-depth look at epidemiological studies on morbimortality due to hematological disorders

#### **Module 7. New Developments in Major Bleeding Disorders**

- ♦ Take an in-depth look at the most innovative and developing alternatives offered when caring for these patients
- ♦ Emphasize future challenges for the development of new diagnostic and treatment strategies to reduce morbidity and mortality

#### **Module 8. Update on Antihemorrhagics**

- ♦ Address, in detail and depth, the most up-to-date scientific evidence on the mechanisms of action, adverse effects, dosage, and use of drugs to treat these diseases
- ♦ Emphasize the development of new drugs for the future and other treatment approaches for controlling these diseases

#### **Module 9. Advances in Leukemia, Lymphoma and other Oncohematologic Diseases**

- ♦ Get up-to-date on the epidemiology, etiopathogenesis, diagnosis, and treatment of the various hematological malignancies: myelodysplastic syndromes, acute myeloid and lymphoid leukemias, chronic myeloproliferative syndromes, Hodgkin and non-Hodgkin lymphomas, plasma cell dyscrasia, etc.

#### **Module 10. Update on Plasma Cell Dyscrasias**

- ♦ Learn about the latest developments in plasma cell dyscrasias

#### **Module 11. New Developments in the General Treatment of Hematologic Diseases**

- ♦ Provide students with advanced, in-depth, up-to-date, and multidisciplinary information that allows them to comprehensively approach the hematological health/disease process, ensuring proper treatment and the use of all appropriate therapeutic procedures
- ♦ Get up to date on the latest concepts of hemotherapy in the use of blood and blood products

#### **Module 12. Blood Donation, Self-Donation and Pre-Transfusion Testing**

- ♦ Understand the process of blood, and blood components, donation, framing it in the context of current legislation
- ♦ Address the donation process specifically, delving into the donor selection process, and the transfusion request process, including the development of pre-transfusion compatibility testing
- ♦ Address the issue of alternatives to allogeneic blood transfusion raised in the Seville Document, with special interest in self-donation. The concept of donation promotion will also be developed, understood as a necessary process to match donation and transfusion, and thus obtain a correct management of resources

#### **Module 13. Immunohematology**

- ♦ Perform an in-depth study of the performance and interpretation of immunohematological tests that will lead the clinician to provide greater safety in the act of transfusion

#### **Module 14. Allogeneic Transfusion and Patient Blood Management (PBM) Overview**

- ♦ Delve into the concepts of Patient Blood Management programs, recommendations for implementation in our environment and to specify transfusion thresholds in the non-bleeding patient



**Module 15. Transfusions in Pediatrics**

- ♦ Gain deeper knowledge of the indications of hemocomponents in pediatric patients, considering it as a therapeutic measure, of which a clear and precise physiological knowledge of pediatrics is necessary in order to avoid unnecessary risks and to make good use of them
- ♦ Determine transfusion thresholds in the pediatric population
- ♦ Focus on the proper use of blood derivatives in the pediatric population

**Module 16. Transfusion and Blood Saving Strategies in Special Situations**

- ♦ Describe and identify special clinical situations in which individualized transfusion strategies are a priority

**Module 17. Processing of Blood Components**

- ♦ Delve into blood components, from their procurement to the quality criteria that must be observed in their production
- ♦ Learn in detail about each of the products, the modifications that can be made to them, such as irradiation, cryopreservation and pathogen inactivation techniques
- ♦ Emphasize the labeling of products, which follows the standards of the International Society of Blood Transfusion (ISBT), which must be respected in order to allow the exchange of components between countries when necessary

**Module 18. Therapeutic Apheresis**

- ♦ Know the apheresis technique, its purpose and usefulness in clinical practice, with its different clinical indications
- ♦ Learn to perform the apheresis procedure or at least know which patients can benefit from this procedure taking into account side effects and complications

**Module 19. Blood Saving Strategies in the Preoperative Setting**

- ♦ Acquire in-depth knowledge of the recommended preoperative evaluation of the patient, in terms of the patient's treatments and pathologies that may increase bleeding complications in surgery
- ♦ Explore strategies for increasing red blood cell mass, especially in patients who will undergo surgery with a high bleeding risk

**Module 20. Blood Saving Strategies in the Intraoperative Setting**

- ♦ Acquire in-depth knowledge of the different methods to reduce intraoperative bleeding and the main indications and thresholds for blood transfusion

**Module 21. Blood Saving Strategies in the Postoperative and Critical Care Setting**

- ♦ Explore the best practices in blood component transfusion and blood-saving strategies in response to the needs of critically ill patients
- ♦ Acquire in-depth knowledge of the recommended guidelines for the management of anticoagulation and thromboprophylaxis in these patients

# 03 Skills

This program will allow professionals to update their skills and incorporate new ones in the area of hematology into their professional practice. Therefore, thanks to this Advanced Master's Degree, specialists will have access to the most advanced diagnostic procedures based on coagulation, thrombosis and fibrinolysis tests, as well as the most advanced transfusion techniques. This enables them to immediately integrate the most innovative knowledge in this medical field into their work.



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*Update your skills with the most cutting edge content, designed by leading international specialists in the field of hematology"*



## General skills

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- ♦ Improve performance and increase expertise in comprehensive medical care for hematologic diseases and general patient care, through the in-depth study of the epidemiological, preventive, clinical, pathophysiological, diagnostic, therapeutic, and rehabilitation elements of these diseases
- ♦ Hone skills to manage, advise, or lead multidisciplinary teams to study blood cell and hematopoietic organ disorders and the medications used to treat them in communities or individual patients, as well as scientific research teams
- ♦ Develop skills for self-improvement, in addition to being able to provide training and professional improvement activities due to the high level of scientific and professional preparation acquired with this program
- ♦ Educate the population in the field of prevention in order to acquire and develop a culture of prevention, based on healthy lifestyle choices
- ♦ Learn how to optimize the use of a limited and costly resource from blood donors, helping to maintain a sustainable health system
- ♦ Master the different strategies and current recommendations for restrictive therapy of hemocomponents in Patient Blood Management and the correct use of other blood derivatives
- ♦ Develop the different skills and abilities required in transfusion medicine







## Specific skills

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- ♦ Master health determiners and their impact on morbidity and mortality rates of hematologic diseases
- ♦ Identify and analyze the latest scientific information on hematology and hemotherapy, as well as associated diseases, in order to design plans and programs to control them
- ♦ Master different techniques of basic and automated hemocytometry, as well as hematological cytomorphology and cytochemistry
- ♦ Master the special techniques of flow cytometry, and basic techniques of molecular biology and cytogenetics applied to hematopoietic processes
- ♦ Diagnose these diseases in a timely manner from the clinical manifestations of patients in early stages to ensure proper treatment, rehabilitation, and control
- ♦ Support the importance of integrated clinical-diagnostic-therapeutic discussion with the participation of all specialists associated in the care of these patients as an important measure in institutional medical care to provide better comprehensive care for these patients
- ♦ Master the clinical, epidemiological, diagnostic, and therapeutic elements supported by the best scientific evidence available for these patients
- ♦ Identify the fundamental aspects of pharmacokinetics and pharmacodynamics for the use of drugs for these diseases
- ♦ Halt the progression of drug misuse, based on reasoned treatment and supported by the best scientific evidence
- ♦ Correctly use and interpret all diagnostic studies and other resources in patient care
- ♦ Master the indications, management, and complications of patients undergoing allogeneic transplantation of hematopoietic progenitors from an unrelated donor
- ♦ Advise pharmaceutical and biotechnology industry teams in the process of research and production of new drugs and alternative treatments for hematologic diseases and hemotherapy
- ♦ Lead teams in health institutions, such as the mortality review committee, quality of care and drug utilization
- ♦ Develop normative or referential documents such as clinical practice guidelines or policies for the care of these patients



*Thanks to this program, you will have access to the most advanced techniques and procedures in this discipline"*

04

# Course Management

This Advanced Master's Degree in Clinical Hematology has an internationally renowned teaching faculty that will guide the specialist throughout the educational itinerary. This teaching faculty will provide physicians with the latest advances in this discipline, ensuring that they can directly apply the new procedures and knowledge to their work after studying the 21 modules that make up the program.



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*The specialists that make up this program's teaching faculty have been carefully selected and stand out for their considerable international reputation in the field of hematology”*

## Management



### Dr. Martínez López, Joaquín

- ♦ Head of the Hematology Department at the 12 de Octubre Hospital (Madrid)
- ♦ PhD in Medicine from the Complutense University of Madrid
- ♦ Hematology Medical Specialist
- ♦ Director of the Translational Research Group and the early clinical trials unit in hematology at 12 de Octubre Hospital
- ♦ More than 140 publications in international scientific journals
- ♦ President of AltumSequencing



### Dr. Urbina Prieto, Raquel

- ♦ Head of the Transfusion and Donation Service at the Rey Juan Carlos University Hospital
- ♦ Attending Physician at La Princesa University Hospital (Madrid), at Infanta Elena University Hospital, Valdemoro, and at Fundación Alcorcón University Hospital
- ♦ Assistant Physician of Hematology, Infanta Leonor University Hospital (HUIL)
- ♦ Resident Physician of Hematology and Hemotherapy, Gregorio Marañón General University Hospital
- ♦ Resident Physician, Clínicas Caracas Hospital (Venezuela)
- ♦ Internal Physician, Metropolitan Polyclinic, Miranda State (Venezuela)
- ♦ Specialist in Hematology and Hemotherapy
- ♦ Surgeon from the Central University of Venezuela (UCV), "José María Vargas" School
- ♦ Degree Validated in Spain: Degree in Medicine



**Dr. Arruga Manzano, Ana**

- ♦ Assistant Physician at the Transfusion Center of the Community of Madrid. Responsible for Blood Component Fractionation and Distribution Areas. Co-leader of the Quality Area and head of Training for Hematology Residents in their rotation at the Transfusion Center
- ♦ Facultative Specialist in Hematology and Hemotherapy
- ♦ Graduated from the Faculty of Medicine of Zaragoza in 1992
- ♦ Doctoral studies: Recognition of Research Sufficiency in December 1996
- ♦ Hematology and Hemotherapy Specialist, Zaragoza University Clinical Hospital, May 2001
- ♦ Family and Community Medicine Specialist, Area 3 of Zaragoza, December 1996
- ♦ Hematologist at the Madrid Hospital Group, at Hospital de Madrid Montepíncipe, Hospital de Torrelodones and Hospital de Madrid Norte Sanchinarro (2005-2011)
- ♦ Hematologist at the Torrejón University Hospital (2011-2016)

**Dr. Hechavarría Nápoles, Maiyelin**

- ♦ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ♦ First Degree Specialist in Family Medicine
- ♦ First Degree Specialist in Hematology from the National Institute of Hematology of Havana, (Cuba)
- ♦ Professor of the Medicine Degree and of the specialty at the Faculty of Medical Sciences, Isla de la Juventud
- ♦ Certificate in Diagnostic Ultrasound
- ♦ Member of the Cuban Society of Hematology

## Professors

### Dr. Batista Valladares, Adrián

- ◆ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ◆ Specialist in Family and Community Medicine
- ◆ Master's Degree in Clinical Infectology
- ◆ Certificate in Diagnostic Ultrasound
- ◆ Diploma in Healthcare Management
- ◆ Head of Senior Citizen Services in Isla de la Juventud (Cuba)
- ◆ Member of the Cuban Society of Family Medicine
- ◆ Professor of the medicine and family medicine degrees at the Faculty of Medical Sciences in Isla de la Juventud
- ◆ Professor of the Professional Master's Degree in Infectious Diseases in the Faculty of Medical Sciences in Isla de la Juventud

### Dr. Cantalapiedra Torres, Alejandro

- ◆ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ◆ Pediatrician at Heroes del Baire Hospital
- ◆ Master's Degree in Infectious Diseases
- ◆ Certificate in Medical Teaching
- ◆ Certificate in Health Management
- ◆ Member of the Cuban Society of Pediatrics
- ◆ Professor in the Medicine Degree and Pediatrics Specialty in the Faculty of Medical Sciences in Isla de la Juventud





**Dr. Carreño Gómez-Tarragona, Gonzalo**

- ◆ Specialist physician at the 12 de Octubre University Hospital
- ◆ Degree in Medicine, Autonomous University of Madrid
- ◆ Master's Degree in Hematopoietic Transplantation, University of Valencia
- ◆ Cytology Course in Myelodysplasia, Del Mar Hospital
- ◆ Teaching collaborator for the following subjects: Hematology and Hemotherapy, Degree of Medicine (Complutense University of Madrid); and Advances in Vascular Function, Degree of Medicine (Autonomous University of Madrid)
- ◆ Participation in the Clinical Research Ethics Committee at the 12 de Octubre University Hospital
- ◆ Participation in national and international conferences
- ◆ Distinction as Best Scientific Communication at the VII National Research Conference for Undergraduate Students in Health Sciences, Complutense University of Madrid

**Dr. De la Garza Amaro, Ernesto**

- ◆ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ◆ Specialist in Family Medicine, Pediatrics, and Intensive Care, Heroes del Baire Hospital
- ◆ Master's Degree in Infectious Diseases
- ◆ Head of the Pediatric Intensive Care Unit at the Héroes del Baire Hospital
- ◆ Member of the Cuban Society of Pediatrics and the Cuban Society of Intensive Care
- ◆ Member of the Cuban Society of Pediatricians
- ◆ Professor on the Medicine Degree and Internal Medicine Speciality at the Faculty of Medical Sciences of Isla de la Juventud
- ◆ Professor of the Professional Master's Degree in Infectious Diseases in the Faculty of Medical Sciences in Isla de la Juventud

**Dr. Luís Dávila, Heenry**

- ♦ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ♦ Specialist in Gynecology and Obstetrics at the Heroes del Baire Hospital (Cuba)
- ♦ Master's Degree in Comprehensive Care for Women
- ♦ Head of the Neck Pathology Service at Heroes del Baire Hospital
- ♦ Member of the Cuban Society of Gynecology and Obstetrics
- ♦ Member of the Cuban Society of Pediatricians
- ♦ Professor on the Medicine Degree in the Faculty of Medical Sciences in Isla de la Juventud

**Dr. Espinosa García, Azahara**

- ♦ Attending Physician in the Anesthesia Department, Rey Juan Carlos University Hospital
- ♦ Faculty Specialist in Anesthesia and Resuscitation
- ♦ Resident of Anesthesiology, Resuscitation, and Pain Management Jiménez Díaz Foundation Hospital (Madrid)
- ♦ Degree in Medicine, University of Córdoba
- ♦ European Diploma in Anesthesiology and Intensive Care, Part I

**Dr. Jiménez Valdés, Erlivan**

- ♦ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ♦ Pediatrician, Heroes del Baire Hospital
- ♦ Master's Degree in Comprehensive Childcare
- ♦ Member of the Cuban Society of Pediatrics
- ♦ Professor in the Medicine Degree and Pediatrics Specialty in the Faculty of Medical Sciences in Isla de la Juventud

**Dr. Matos Rodríguez, Zaskia**

- ♦ First Degree Specialist in Gynecology and Obstetrics of Heroes del Baire General Teaching Hospital
- ♦ Professor of the Medicine Degree and of the specialty at the Faculty of Medical Sciences, Isla de la Juventud
- ♦ Member of the Cuban Society of Gynecology and Obstetrics
- ♦ Participation in several research projects and publication of scientific articles in national and international journals in Cuba, Spain, Mexico, Chile, Colombia, United States, and United Kingdom

**Dr. Narváez, Jimena**

- ♦ Attending Physician in the Anesthesia Department, Rey Juan Carlos University Hospital
- ♦ Faculty Specialist in Anesthesia and Resuscitation Residency completed at La Paz University Hospital, Madrid, which has nationally acclaimed services in Cardiothoracic Resuscitation, Pediatric Anesthesia and Obstetrics
- ♦ Anesthesiology and Resuscitation Service of the Madrid Hospitals Group: HM Madrid, HM Montepríncipe, HM Sanchinarro, HM Puerta del Sur Móstoles, Belén Clinic
- ♦ San Francisco de Asís Clinic Anesthesiology and Resuscitation Service, Maternity Department
- ♦ Degree in Medicine from the University of Buenos Aires, Argentina with a Diploma of Special Distinction
- ♦ European Diploma in Anesthesiology and Intensive Care, Part I



**Dr. Rodríguez Rodríguez, Mario**

- ◆ Specialist in Thrombophilia and Hemostasis consultation and in Basic and Special Coagulation Laboratory at the 12 de Octubre University Hospital
- ◆ Graduate in Medicine and Surgery from the Complutense University of Madrid
- ◆ Hematology on-call duty as an attending physician (Faculty Specialist)
- ◆ Medical Intern Resident in Hematology and Hemotherapy at the 12 de Octubre University Hospital
- ◆ Participation in quality work for ENAC accreditation in the coagulation laboratory at the 12 de Octubre University Hospital
- ◆ Usability study/evaluation of the cobas t711 coagulometer, Roche Diagnostics
- ◆ Participation in the following publications: "Evaluation of The MD Anderson Tumor Score for Diffuse Large B-cell Lymphoma in the Rituximab Era", "Clinical course and risk factors for mortality from COVID-19 inpatients with hematological malignancies" and "Thrombosis and antiphospholipid antibodies in patients with SARS-COV-2 infection (COVID-19)", among others

**Dr. Paciello Coronel, María Liz**

- ◆ Specialist in Hematology and Hemotherapy, 12 de Octubre University Hospital
- ◆ Graduate in Medicine and Surgery, National University of Asunción, Paraguay
- ◆ Collaborator in clinical trials as principal investigator and sub-investigator

**Dr. Pérez de Camino Gaisse, Begoña**

- ◆ Attending Physician, Transfusion and Donation Service, Jiménez Díaz Foundation University Hospital
- ◆ Faculty Specialist in Hematology and Hemotherapy
- ◆ Specialty in Hematology and Hemotherapy, Puerta de Hierro University Hospital, Majadahonda, Madrid
- ◆ Degree in Medicine from the Autonomous University Madrid

**Dr. Quintero Casanova, Jesús**

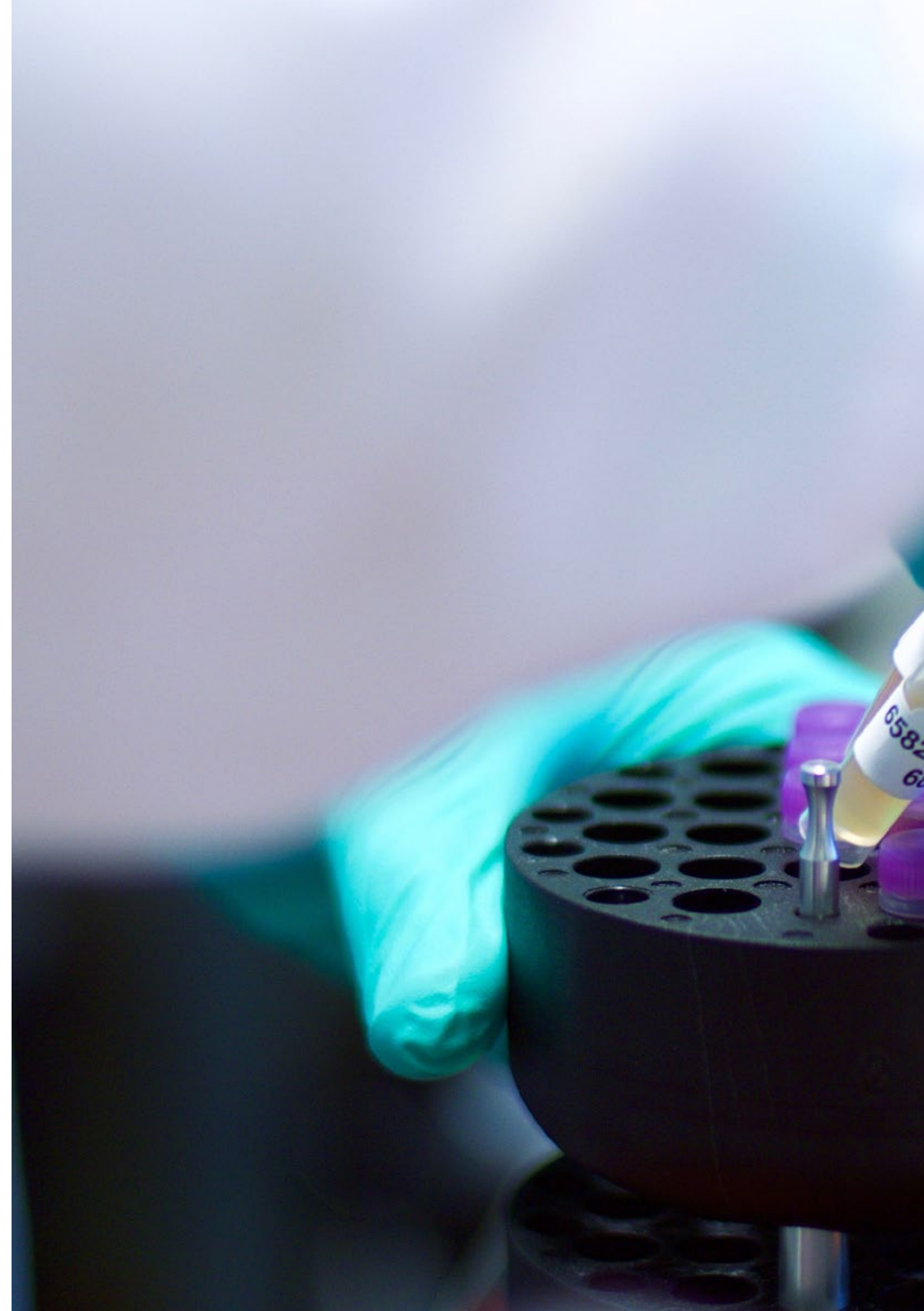
- ◆ Degree in Medicine and Surgery from the Medical University of Havana (Cuba)
- ◆ Specialist in Internal Medicine, Heroes del Baire Hospital
- ◆ Master's Degree in Tropical Diseases and Clinical Infectious Diseases from the Pedro Kuori Institute, Havana (Cuba)
- ◆ Head of the Infectious Diseases Department of the Héroes del Baire Hospital
- ◆ Member of the Cuban Society of Internal Medicine and the Cuban Society of Teachers
- ◆ Medical specialist in Africa (TChad) and Venezuela
- ◆ Professor on the Medicine Degree and Internal Medicine Speciality at the Faculty of Medical Sciences of Isla de la Juventud
- ◆ Main professor of the Professional Master's Degree in infectious diseases of the Faculty of Medical Sciences of the Isla de la Juventud
- ◆ Member of state examining boards for the medicine degree and internal medicine

**Dr. Sánchez Pina, José María**

- ♦ Attending Physician in the area of hospitalization and hematopoietic transplantation. Member of the cell therapy group
- ♦ Degree in Medicine, University of Alcalá
- ♦ Master's Degree in Hematopoietic Transplantation, 4th edition, University of Valencia
- ♦ Resident intern of Hematology and Hemotherapy at the 12 de Octubre University Hospital in Madrid
- ♦ Teaching collaborator in the Master's Degree in Translational Medicine, Complutense University of Madrid; and Master's Degree in Organ and Tissue Transplants, European University of Madrid

**Dr. Sabrido Bermúdez, Gema**

- ♦ Assistant in the Pediatrics Department, Rey Juan Carlos University Hospital
- ♦ Head of Pediatric Hematology
- ♦ Attending Physician in the Pediatric Emergency Department of the Quirón Sur Alcorcón Hospital
- ♦ Resident Intern of Pediatrics, Alicante General University Hospital
- ♦ Specialty residency in the last year in Pediatric Hematology Oncology at the Niño Jesús Hospital in Madrid and the General University Hospital in Alicante
- ♦ Pediatric Hemato-Oncology Specialist
- ♦ Degree in Medicine and Surgery, Cádiz University
- ♦ Diploma in Complete Neonatal Resuscitation, Alicante General University Hospital
- ♦ Diploma in Basic and Advanced Pediatric and Neonatal CPR, University of Alicante





**Dr. Serrano Amador, Alexander**

- ◆ 1st Degree Specialist in General Medicine
- ◆ Assistant Professor of the Medical Sciences Branch in Isla de la Juventud
- ◆ Diploma in Higher Medical Education
- ◆ Diploma in Direction and Management of Medical Services
- ◆ Head of the Municipal Teaching Department of General Comprehensive Medicine and Public Health of the Medical Sciences Branch in Isla de la Juventud
- ◆ Member of the Cuban Society of General Medicine

**Dr. Terra Infante, Anielka**

- ◆ Degree in Medicine and Surgery from the University of Havana (Cuba)
- ◆ First Degree Specialist in Hematology from the National Institute of Hematology, Havana (Cuba)
- ◆ Attending physician in the regenerative medicine and stem cell program at the Roberto Pérez Municipal Blood Bank, Isla de la Juventud (Cuba)
- ◆ Professor of the Medicine Degree and of the specialty at the Faculty of Medical Sciences, Isla de la Juventud
- ◆ Member of the Cuban Society of Hematology
- ◆ National course on oncologic emergencies
- ◆ Medical Hematologist in Merida (Mexico)



05

# Structure and Content

This Advanced Master's Degree in Clinical Hematology has been developed by renowned experts in this area who have been responsible for integrating into a single program the most relevant advances in the discipline. Accordingly, throughout 21 specialized modules, the professional will be able to delve into issues such as iron deficiency anemia and alterations in iron metabolism and iron overload, plasma factors and the coagulation cascade or the management of massive hemorrhage in pediatrics, among others.





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*The most comprehensive program on the market to learn about all the latest developments in Clinical Hematology”*

## Module 1. Recent Discoveries in Hematopoiesis, Cytogenetics and Immunophenotyping in Hematology

- 1.1. Current Role of Hematopoietic Multipotent Cell, Progenitor Cells, Growth Factors, and Cytokines
  - 1.1.1. Hematopoietic Stem Cells: Characteristics and Functions
  - 1.1.2. Progenitor Cells
  - 1.1.3. Hematopoietic Growth Factors
  - 1.1.4. Cytokines
- 1.2. Biopathology of Granulopoiesis and Monocytopoiesis
  - 1.2.1. Biopathology of Granulopoiesis
  - 1.2.2. Biopathology of Monocytopoiesis
- 1.3. Advances in the Structure and Function of Lymphoid Tissue
  - 1.3.1. Structure of the Lymphoid Tissue
  - 1.3.2. Types of Lymphoid Tissue
  - 1.3.3. Function of Lymphoid Tissue
- 1.4. Immune System Current Events. Development, Regulation, and Activation of B and T Cells
  - 1.4.1. Development and Regulation of the Innate Immune System
  - 1.4.2. Development and Regulation of the Adaptive Immune System
  - 1.4.3. Immune System Functions
  - 1.4.4. Immunosuppression
- 1.5. Differentiation Antigens: Latest Findings
  - 1.5.1. Types of Differentiation Antigens
  - 1.5.2. Physiology
  - 1.5.3. Diagnostic Utilities
- 1.6. New Developments in Megakaryopoiesis and Thrombopoiesis
  - 1.6.1. Biology of Megakaryopoiesis
  - 1.6.2. Biology of Thrombopoiesis
- 1.7. Update on Cell Cultures and Cytokines
  - 1.7.1. Types of Cell Cultures
  - 1.7.2. Cell Culture Biology
  - 1.7.3. Cell Culture Uses
  - 1.7.4. Cytokines and their Role in Cell Differentiation

## Module 2. Update on the Importance of Laboratories in Hematology and Hemotherapy

- 2.1. Development of Specialized Laboratory Techniques in Recent Years
  - 2.1.1. Handling of Autoanalyzers
  - 2.1.2. Cytomorphology of Peripheral Blood
  - 2.1.3. Bone Marrow Cytomorphology. Cytochemical Techniques. Bone Marrow Aspiration, Medulogram
- 2.2. Diagnostic Techniques of Anemic Syndrome: Recent Advances
  - 2.2.1. Hemoglobin and Hematocrit
  - 2.2.2. Peripheral Lamina
  - 2.2.3. Reticulocyte Count
  - 2.2.4. Hemolysis Tests
  - 2.2.5. Other Tests for Studying Anemias
- 2.3. Flow Cytometry in the Diagnosis of Hematologic Diseases
  - 2.3.1. Fundamentals and Methodology of the Cytometry Technique
  - 2.3.2. Usefulness in the Diagnosis of Hematologic Diseases
- 2.4. Basic Cytogenetic and Molecular Biology Techniques
  - 2.4.1. Principles of Cytogenetics
  - 2.4.2. Cytogenetics and Genetic Rearrangements in Hematologic Diseases
  - 2.4.3. Cytogenetic Techniques
  - 2.4.4. Principles and Techniques of Molecular Biology in Hematology
- 2.5. New Techniques of Hemostasis and Thrombosis
  - 2.5.1. Tests that Measure the Functioning of Primary Hemostasis
  - 2.5.2. Tests that Measure the Functioning of Secondary Hemostasis
  - 2.5.3. Evidence of Physiological Inhibitors of Coagulation
- 2.6. Immunohematology Techniques: Present and Future
  - 2.6.1. Basis and Methodology of Immunohematology Techniques
  - 2.6.2. Usefulness for Diagnosing Hematologic Diseases

- 2.7. Therapeutic Apheresis Techniques: Current Developments
  - 2.7.1. Plasmapheresis
  - 2.7.2. Leukoapheresis
  - 2.7.3. Erythroapheresis
  - 2.7.4. Thrombocytapheresis
- 2.8. Current Techniques for the Procurement, Handling and Preservation of Hematopoietic Progenitor Cells
  - 2.8.1. Progenitor Cell Donor Selection
  - 2.8.2. Progenitor Mobilization in Autologous and Healthy Donor
  - 2.8.3. Apheresis of Hemopoietic Progenitors in Autologous and Allogeneic Transplantation
  - 2.8.4. Bone Marrow Extraction by Surgical Procedure
  - 2.8.5. Lymphocyte Collection: Procedure, Indications, Complications
  - 2.8.6. Product Suitability Tests: Minimum Cellularity, Viability, Microbiological Studies
  - 2.8.7. Progenitor Infusion: Procedure and Complications

### Module 3. Update on Anemia

- 3.1. Mechanism of Erythropoiesis, Erythroid Differentiation and Maturation.
  - 3.1.1. Biopathology and Physiopathology of Erythrocytes
  - 3.1.2. Structure and Types of Hemoglobin
  - 3.1.3. Functions of Hemoglobin
- 3.2. Classification of Erythrocyte Disorders and Clinical Manifestations
  - 3.2.1. Classification of Erythrocyte Disorders
  - 3.2.2. Symptoms and Signs of Anemia by Organ Systems
- 3.3. Pure Red Cell Aplasia
  - 3.3.1. Concept
  - 3.3.2. Etiology
  - 3.3.3. Clinical Manifestations
  - 3.3.4. Diagnosis
  - 3.3.5. Current Treatment Alternatives

- 3.4. Congenital Dyserythropoietic Anemias
  - 3.4.1. Concept
  - 3.4.2. Etiology
  - 3.4.3. Clinical Manifestations
  - 3.4.4. Diagnosis
  - 3.4.5. Current Treatments
- 3.5. Iron Deficiency Anemia and Alterations in Iron Metabolism and Iron Overload: Current Management
  - 3.5.1. Concept
  - 3.5.2. Classification and Etiology
  - 3.5.3. Clinical Picture
  - 3.5.4. Staged Diagnosis of Iron Disorders
  - 3.5.5. Treatment Variants of Iron Disorders
- 3.6. Megaloblastic Anemias: Recent Advances
  - 3.6.1. Concept
  - 3.6.2. Classification and Etiology
  - 3.6.3. Clinical Picture
  - 3.6.4. Diagnostic Approach.
  - 3.6.5. Current Treatment Schemes and Recommendations
- 3.7. Hemolytic Anemias: From Laboratory to Clinic
  - 3.7.1. Concept
  - 3.7.2. Classification and Etiology
  - 3.7.3. Clinical Picture
  - 3.7.4. Diagnostic Challenges
  - 3.7.5. Alternative Treatments
- 3.8. Hemoglobin Disorder Anemias
  - 3.8.1. Concept
  - 3.8.2. Classification and Etiology
  - 3.8.3. Clinical Picture
  - 3.8.4. Analytical Diagnostic Challenges
  - 3.8.5. Treatment Variants

#### Module 4. Scientific Developments in Spinal Cord Disorders

- 4.1. Medullary Aplasia
  - 4.1.1. Definition
  - 4.1.2. Epidemiology and Etiology
  - 4.1.3. Clinical Manifestations
  - 4.1.4. Clinical and Staged Diagnosis according to Diagnostic Tests
  - 4.1.5. Latest Treatment Recommendations
- 4.2. Myelodysplastic Syndromes: Latest Classifications
  - 4.2.1. Definition
  - 4.2.2. Epidemiology
  - 4.2.3. Clinical Manifestations
  - 4.2.4. Diagnosis and Current Classifications
  - 4.2.5. Current Review of the Treatment and Use of Hypomethylating Therapy
- 4.3. Updated Approach to Agranulocytosis
  - 4.3.1. Definition
  - 4.3.2. Epidemiology and Etiology
  - 4.3.3. Clinical Manifestations
  - 4.3.4. Diagnostic Complexities
  - 4.3.5. New Developments in Treatment
- 4.4. Polycythemia Vera
  - 4.4.1. Definition
  - 4.4.2. Epidemiology
  - 4.4.3. Clinical Manifestations
  - 4.4.4. Diagnosis
  - 4.4.5. Current Treatment Alternatives
- 4.5. Essential Thrombocythemia
  - 4.5.1. Definition
  - 4.5.2. Epidemiology
  - 4.5.3. Clinical Manifestations
  - 4.5.4. Diagnosis
  - 4.5.5. Treatment Review

- 4.6. Chronic Idiopathic Myelofibrosis
  - 4.6.1. Definition
  - 4.6.2. Epidemiology
  - 4.6.3. Clinical Manifestations
  - 4.6.4. Diagnosis
  - 4.6.5. Therapeutic Approaches
- 4.7. Hypereosinophilic Syndrome
  - 4.7.1. Definition
  - 4.7.2. Epidemiology
  - 4.7.3. Clinical Manifestations
  - 4.7.4. Diagnostic Complexities
  - 4.7.5. Treatment: Literature Review
- 4.8. Mastocytosis
  - 4.8.1. Definition
  - 4.8.2. Epidemiology
  - 4.8.3. Clinical Manifestations
  - 4.8.4. Use of Diagnostic Tests
  - 4.8.5. Alternative Treatments

#### Module 5. Current Events in Hemostasis Physiology

- 5.1. Update on the Biopathology of Hemostasis Types
  - 5.1.1. Primary Hemostasis
  - 5.1.2. Secondary Hemostasis
- 5.2. Advances in Vascular Endothelium Biology and Functions
  - 5.2.1. Vascular Endothelium Biology
  - 5.2.2. Vascular Endothelium Functions
  - 5.2.3. Main Vascular Endothelial Mediators
  - 5.2.4. Endothelial Dysfunction
- 5.3. Platelets and their Role in Coagulation: Recent Discoveries
  - 5.3.1. Platelet Formation
  - 5.3.2. Platelet Functions and Mediators
  - 5.3.3. Platelets in Hemostasis

- 5.4. Plasma Factors and the Coagulation Cascade: From Research to the Clinic
  - 5.4.1. Synthesis and Structure of Coagulation Factors
  - 5.4.2. Functions of Plasma Coagulation Factors in the Coagulation Cascade
  - 5.4.3. Coagulation Factor Deficiency
- 5.5. Cofactors Necessary for Blood Coagulation
  - 5.5.1. Vitamin K and Coagulation
  - 5.5.2. Prekallikrein
  - 5.5.3. High Molecular Weight Cininogen
  - 5.5.4. Von Willebrand Factor
- 5.6. Physiological Inhibitors of Coagulation
  - 5.6.1. Antithrombin
  - 5.6.2. Protein C - Protein S System
  - 5.6.3. Antitrypsins
  - 5.6.4. Antiplasmins
  - 5.6.5. Other Coagulation Inhibitor Proteins
- 5.7. Current Events in Pregnancy and Hemostasis
  - 5.7.1. Hemostasis Changes during Pregnancy
  - 5.7.2. Fibrinolysis Changes during Pregnancy
- 5.8. New Developments in Hemostasis in Liver Failure and Kidney Failure
  - 5.8.1. Acute Liver Failure and Hemostatic Disorders
  - 5.8.2. Chronic Liver Failure and Hemostatic Disorders
  - 5.8.3. Hemostasis in Chronic Kidney Disease
  - 5.8.4. Hemostasis in Patients with Renal Function Replacement Treatment

## Module 6. Update on Coagulation, Thrombosis, and Fibrinolysis Tests

- 6.1. Primary and Secondary Hemostasis Evaluation Tests
  - 6.1.1. Tests to Assess the Role of the Vascular Endothelium
  - 6.1.2. Tests to Assess the Role of Platelets in Hemostasis
  - 6.1.3. Tests that Assess the Role of Coagulation Factors in the Enzymatic Cascade
- 6.2. Interpretation of Prothrombin, Thrombin, and Activated Thromboplastin Times
  - 6.2.1. Prothrombin Time Interpretation
  - 6.2.2. Thrombin Time Interpretation
  - 6.2.3. Interpretation of Activated Thromboplastin Time
- 6.3. Usefulness of Thromboelastography: Its Current Role
  - 6.3.1. Definition
  - 6.3.2. Use
  - 6.3.3. Interpretation
- 6.4. Fibrinolysis Tests: The Mediators of Tissue Reperfusion
  - 6.4.1. Tests that Assess Fibrinolysis
  - 6.4.2. Uses
  - 6.4.3. Interpretation
- 6.5. Diagnosis of Hemophilia: Traditional and the Latest Techniques
  - 6.5.1. Types of Hemophilia
  - 6.5.2. Tests to Diagnose Hemophilia
- 6.6. Monitoring Coagulation in Patients with Critical Bleeding Disorders
  - 6.6.1. Hemostasis in Critically Ill Patients
  - 6.6.2. Tests for Monitoring Bleeding Disorders in Critically Ill Patients
- 6.7. Laboratory Monitoring of Patients on Oral Anticoagulants
  - 6.7.1. Traditional and New Oral Anticoagulants
  - 6.7.2. Evidence for Monitoring Patients on Direct Oral Anticoagulants
- 6.8. Laboratory Monitoring in Patients Treated with Heparins
  - 6.8.1. Heparins in Anticoagulant Treatment
  - 6.8.2. Tests for Monitoring Heparin Treatment



## Module 7. New Developments in Major Bleeding Disorders

- 7.1. Vascular Hemorrhagic Disorders
  - 7.1.1. Definition
  - 7.1.2. Epidemiology
  - 7.1.3. Clinical Manifestations
  - 7.1.4. Diagnostic Difficulties
  - 7.1.5. Treatment Developments
- 7.2. Platelet Hemorrhagic Disorders
  - 7.2.1. Definition
  - 7.2.2. Epidemiology and Etiology
  - 7.2.3. Clinical Manifestations
  - 7.2.4. Diagnostic Complexities
  - 7.2.5. New Treatment Approaches
- 7.3. Hemophilia
  - 7.3.1. Definition
  - 7.3.2. Epidemiology
  - 7.3.3. Clinical Manifestations
  - 7.3.4. Diagnosis
  - 7.3.5. Treatment and Current Issues in Electrical Therapy
- 7.4. Von Willebrand Disease: Diagnostic and Therapeutic Challenge
  - 7.4.1. Definition
  - 7.4.2. Epidemiology
  - 7.4.3. Clinical Manifestations
  - 7.4.4. Diagnosis by Screening Tests
  - 7.4.5. Treatment
- 7.5. Hemorrhagic Disorders due to Vitamin K Deficiency
  - 7.5.1. Definition
  - 7.5.2. Epidemiology
  - 7.5.3. Clinical Manifestations
  - 7.5.4. Etiological Diagnosis
  - 7.5.5. Treatment Plans





- 7.6. Hemorrhagic Disorders due to Excess Anticoagulants
  - 7.6.1. Definition
  - 7.6.2. Epidemiology
  - 7.6.3. Clinical Manifestations
  - 7.6.4. Diagnostic Tests
  - 7.6.5. Treatment Complexities
- 7.7. Acquired Hemorrhagic Disorders
  - 7.7.1. Definition
  - 7.7.2. Epidemiology
  - 7.7.3. Clinical Manifestations
  - 7.7.4. Diagnosis: The Role of Necessary Tests
  - 7.7.5. Treatment
- 7.8. Disseminated Intravascular Coagulation: Recent Findings
  - 7.8.1. Definition
  - 7.8.2. Epidemiology and Etiology
  - 7.8.3. Clinical Manifestations
  - 7.8.4. Use of Diagnostic Tests
  - 7.8.5. Alternative Treatments

## Module 8. Update on Antihemorrhagics

- 8.1. Antihemorrhagic Drugs
  - 8.1.1. Definitions
  - 8.1.2. Main Drugs
  - 8.1.3. Mechanism of Action
  - 8.1.4. Main Indications
- 8.2. Use of Vitamin K in Hemorrhagic Disorders
  - 8.2.1. Indication of Vitamin K in Hemorrhagic Disorders
  - 8.2.2. Pharmacokinetics and Pharmacodynamics
  - 8.2.3. Presentation and Dosage
- 8.3. Coagulation Factor Concentrate
  - 8.3.1. Therapeutic indications
  - 8.3.2. Pharmacokinetics and Pharmacodynamics
  - 8.3.3. Presentation and Dosage

- 8.4. Use of Fresh Frozen Plasma and Protamine Sulfate
  - 8.4.1. Therapeutic indications
  - 8.4.2. Pharmacokinetics and Pharmacodynamics
  - 8.4.3. Presentation and Dosage
- 8.5. Latest Recommendations for the Use of Platelets
  - 8.5.1. Therapeutic indications
  - 8.5.2. Pharmacokinetics and Pharmacodynamics
  - 8.5.3. Presentation and Dosage
- 8.6. Platelet Aggregation Inhibitors: The Reality of Use
  - 8.6.1. Therapeutic indications
  - 8.6.2. Pharmacokinetics and Pharmacodynamics
  - 8.6.3. Presentation and Dosage
- 8.7. Capillary Protective and Hemostatic Vasoconstrictor Drugs
  - 8.7.1. Therapeutic indications
  - 8.7.2. Pharmacokinetics and Pharmacodynamics
  - 8.7.3. Presentation and Dosage
- 8.8. Antifibrinolytics
  - 8.8.1. Therapeutic Indications
  - 8.8.2. Pharmacokinetics and Pharmacodynamics
  - 8.8.3. Presentation and Dosage

## Module 9. Advances in Leukemia, Lymphoma and other Oncohematologic Diseases

- 9.1. Hodgkin's Lymphoma
  - 9.1.1. Epidemiology
  - 9.1.2. Typification and Immunophenotyping
  - 9.1.3. Clinical Manifestations
  - 9.1.4. Diagnosis and Staging
  - 9.1.5. Current Treatment
- 9.2. Non-Hodgkin's Lymphomas
  - 9.2.1. Epidemiology
  - 9.2.2. Typification and Immunophenotyping
  - 9.2.3. Clinical Manifestations
  - 9.2.4. Diagnosis and Staging
  - 9.2.5. Current Treatment

- 9.3. Acute Lymphocytic Leukemia
  - 9.3.1. Epidemiology
  - 9.3.2. Immunophenotype
  - 9.3.3. Clinical Manifestations
  - 9.3.4. Diagnosis
  - 9.3.5. Current Treatment Alternatives
- 9.4. Acute Nonlymphocytic Leukemia
  - 9.4.1. Epidemiology
  - 9.4.2. Immunophenotype
  - 9.4.3. Clinical Manifestations
  - 9.4.4. Diagnosis
  - 9.4.5. Current Treatment Alternatives
- 9.5. Chronic Myeloid Leukemia
  - 9.5.1. Epidemiology
  - 9.5.2. Immunophenotype
  - 9.5.3. Clinical Manifestations
  - 9.5.4. Diagnosis
  - 9.5.5. Current Treatment
- 9.6. Chronic Lymphocytic Leukemia
  - 9.6.1. Epidemiology
  - 9.6.2. Immunophenotype
  - 9.6.3. Clinical Manifestations
  - 9.6.4. Diagnosis
  - 9.6.5. Current Treatment

## Module 10. Update on Plasma Cell Dyscrasias

- 10.1. Updated Approach to the Management of Multiple Myeloma
  - 10.1.1. Definition
  - 10.1.2. Epidemiology
  - 10.1.3. Clinical Manifestations
  - 10.1.4. Diagnosis and Staging
  - 10.1.5. Review of Treatment and New Paradigms of Autologous Transplantation
- 10.2. Solitary Plasmacytoma
  - 10.2.1. Definition
  - 10.2.2. Epidemiology
  - 10.2.3. Clinical Manifestations
  - 10.2.4. Diagnosis
  - 10.2.5. Alternative Treatments
- 10.3. Waldenström's Macroglobulinemia
  - 10.3.1. Definition
  - 10.3.2. Epidemiology
  - 10.3.3. Clinical Manifestations
  - 10.3.4. Diagnosis
  - 10.3.5. New Treatments
- 10.4. Heavy Chain Disease
  - 10.4.1. Definition
  - 10.4.2. Epidemiology
  - 10.4.3. Clinical Manifestations
  - 10.4.4. Diagnosis
  - 10.4.5. Treatment
- 10.5. Monoclonal Gammopathy of Uncertain Significance

- 10.5.1. Definition
- 10.5.2. Epidemiology
- 10.5.3. Clinical Manifestations
- 10.5.4. Diagnosis
- 10.5.5. New Treatments

- 10.6. Amyloidosis
  - 10.6.1. Definition
  - 10.6.2. Epidemiology
  - 10.6.3. Clinical Manifestations
  - 10.6.4. Diagnosis
  - 10.6.5. Current Treatments

## Module 11. New Developments in the General Treatment of Hematologic Diseases

- 11.1. Antineoplastic Agents
  - 11.1.1. Groups
  - 11.1.2. Mechanisms of Action
  - 11.1.3. Pharmacodynamics
  - 11.1.4. Pharmacokinetics
  - 11.1.5. Dose and Presentation
  - 11.1.6. Adverse Effects
- 11.2. Treatment of Infections in Hematology Patients
  - 11.2.1. Febrile Neutropenic Patients
  - 11.2.2. Most Frequent Infections in Hematology Patients
  - 11.2.3. Most Frequently Used Antibiotic Treatments
- 11.3. Hematopoietic Progenitor Cell Transplantation
  - 11.3.1. General Concepts
  - 11.3.2. Indications
  - 11.3.3. Results and Impact
- 11.4. Methods and Indications for Cell Therapy
  - 11.4.1. General Concepts
  - 11.4.2. Types of Cell Therapy
  - 11.4.3. Indications
  - 11.4.4. Results and Impact



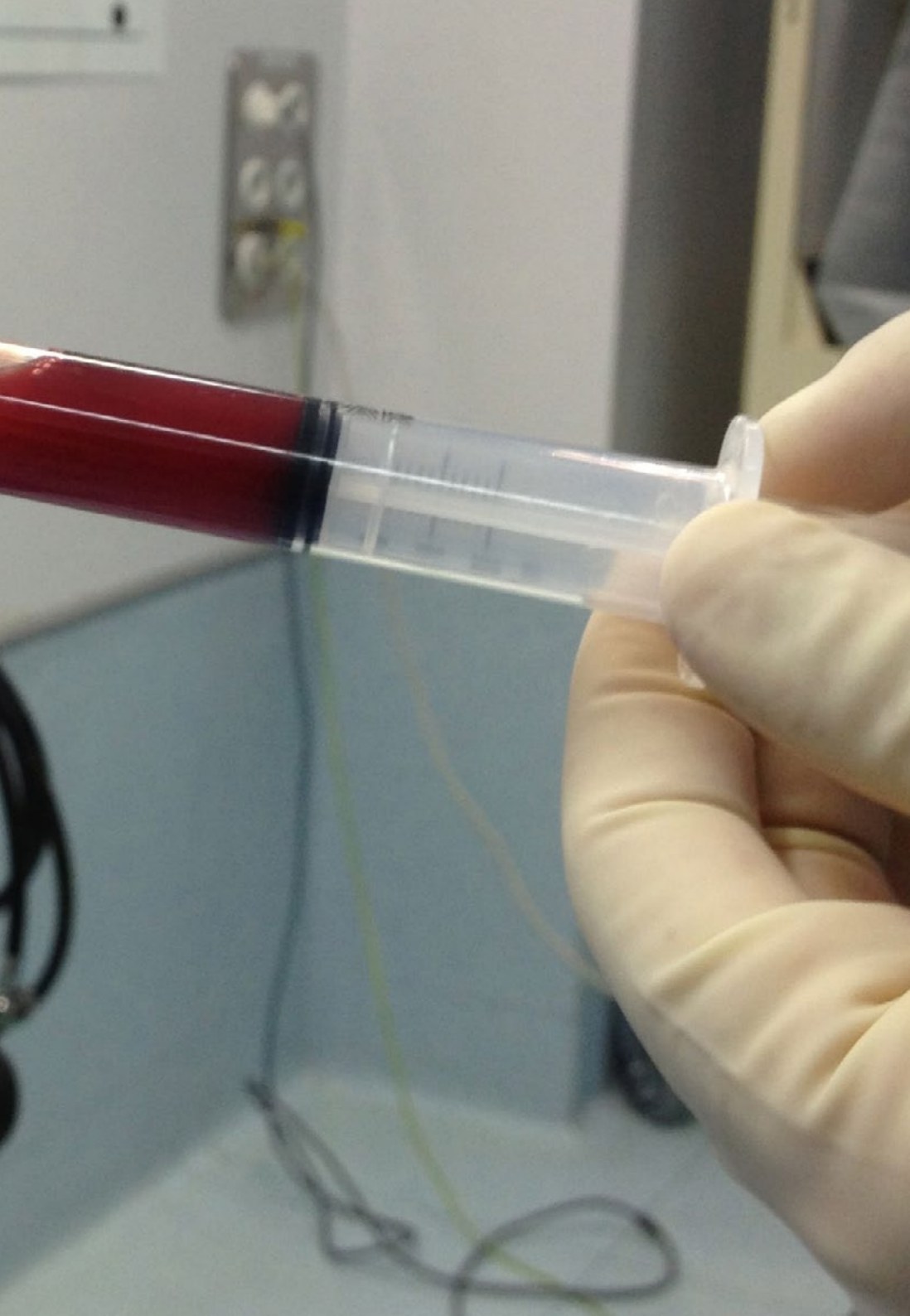
- 11.5. Principles of Gene Therapy
  - 11.5.1. General Concepts
  - 11.5.2. Indications
  - 11.5.3. Results and Future Impact
- 11.6. Monoclonal Antibodies in Hematological Malignancies
  - 11.6.1. General Concepts
  - 11.6.2. Indications
  - 11.6.3. Impact of Use
- 11.7. Innovative CAR-T Cell Treatment of Hematological Malignancies
  - 11.7.1. General Concepts
  - 11.7.2. Indications
  - 11.7.3. Impact of Use
- 11.8. Palliative Care for Hematology Patients
  - 11.8.1. General Concepts
  - 11.8.2. Treatment of the Main Symptoms in Oncohematology Patients
  - 11.8.3. Palliative Care in the End-Stage Patient and End-of-Life Care

## Module 12. Blood Donation, Self-Donation and Pre-Transfusion Testing

- 12.1. Donation of Blood and Blood Components
  - 12.1.1. Technical Requirements and Minimum Conditions for Hemodonation and Transfusion Centers and Transfusion Services
  - 12.1.2. The Principle of Altruism
  - 12.1.3. Data Protection and Confidentiality
- 12.2. The Whole Blood and Component Donation Process
  - 12.2.1. Donor Selection
  - 12.2.2. Donor Recognition and Donation Verification
  - 12.2.3. Donation of Components by Apheresis
- 12.3. Adverse Effects of Donation
  - 12.3.1. Incidents Related to Whole Blood Donation and Apheresis
  - 12.3.2. Effects Related to the Administration of Citrate
- 12.4. The Analysis of Blood Donation
  - 12.4.1. Immunohematological and Complementary Analysis
  - 12.4.2. Microbiological Analysis







- 12.5. Prescription and Administration of Blood and Blood Components
  - 12.5.1. Guide to the Transfusion of Blood Components and Plasma Derivatives of the Spanish Society of Blood Transfusion, 5th edition
  - 12.5.2. Request for Transfusion and Pre-Transfusion Samples
- 12.6. Pre-Transfusion Testing
  - 12.6.1. Plate, Tube and Gel Techniques
- 12.7. Alternatives to Allogeneic Blood Transfusion
  - 12.7.1. Autotransfusion: Autologous Donation and Autologous Transfusion
  - 12.7.2. Exclusion Criteria for Autologous Donations
  - 12.7.3. The Utility of Autotransfusion
- 12.8. Directed Blood Component Donation
  - 12.8.1. Indications for Directed Donation
- 12.9. Encouraging Donation
- 12.10. Hemovigilance
  - 12.10.1. The Spanish Hemovigilance System and Neighboring Countries
  - 12.10.2. Incidents Related to the Donation and Processing of Blood Components
  - 12.10.3. Transfusion-Related Incidents
  - 12.10.4. The Look-Back

### Module 13. Immunohematology

- 13.1. Red Blood Cell Immunohematology
  - 13.1.1. ABO, Rh and Other Blood Grouping Systems
  - 13.1.2. Classification of Blood Grouping Systems
- 13.2. Platelet Immunohematology
  - 13.2.1. Antigens and Platelet Antibodies
  - 13.2.2. Study Techniques and Clinical Significance
  - 13.2.3. Study of Alloimmune Neonatal Thrombopenia
- 13.3. Leukocyte Immunohematology
  - 13.3.1. The HLA System Antigens and Leukocyte Antibodies
  - 13.3.2. Study Techniques and Clinical Significance
- 13.4. Autoimmune Hemolytic Anemia
  - 13.4.1. Immunohematological Tests

- 13.5. Hemolytic Disease of the Fetus and Newborn
  - 13.5.1. HDN due to Anti-D and Other Erythrocyte Groups
- 13.6. Platelet Refractoriness
  - 13.6.1. Diagnosis and Management
- 13.7. Rare Phenotypes
  - 13.7.1. Diagnosis of Rare Phenotypes
- 13.8. The Panagglutination Problem in Pretransfusion Compatibility Tests
  - 13.8.1. Diagnostic Approach
- 13.9. TRALI or Transfusion-Related Acute Lung Injury
  - 13.9.1. Vlaar's Classification of Pulmonary Complications of Transfusion
- 13.10. The Indication for Transfusion of Phenotype-Matched Blood

#### Module 14. Allogeneic Transfusion and Patient Blood Management (PBM) Overview

- 14.1. Patient Blood Management (PBM)
  - 14.1.1. The Fundamentals of Patient Blood Management
- 14.2. Recommendations for Implementing a Patient Blood Management Program
  - 14.2.1. Organization and Role of Each Member
- 14.3. Restrictive Therapy
- 14.4. Red Blood Cell Transfusion Thresholds
  - 14.4.1. Not Recommended
- 14.5. Therapeutic and Prophylactic Use of Platelet Transfusion
  - 14.5.1. Factors Affecting Platelet Yield
  - 14.5.2. Contraindications
- 14.6. Damage from Storage
- 14.7. Other Blood Derivatives and Prohemostats
  - 14.7.1. Fibrinogen
  - 14.7.2. Antithrombin
  - 14.7.3. Tranexamic Acid
  - 14.7.4. Desmopressin
  - 14.7.5. Prothrombin Complexes and rFVIIa

#### Module 15. Transfusions in Pediatrics

- 15.1. Transfusion Medicine in Pediatrics
  - 15.1.1. Optimal Transfusion Volumes
  - 15.1.2. Indication of Irradiated Components in Pediatrics
- 15.2. Transfusion of Intrauterine Hemocomponents
  - 15.2.1. Current Indications for Intrauterine Transfusion
- 15.3. Red Blood Cells Transfusion in Children Younger than 4 Months of Age
  - 15.3.1. Preterm Anemia
  - 15.3.2. Red Blood Cell Concentrate Transfusion Thresholds
- 15.4. Platelet Transfusion in Children Younger than 4 Months of Age
  - 15.4.1. Prophylactic Platelet Transfusion
  - 15.4.2. Alloimmune Neonatal Thrombopenia
- 15.5. Plasma Transfusion in Children Younger 4 Months of Age
  - 15.5.1. Indications for Fresh Frozen Plasma in the Neonatal Period
- 15.6. Exchange Transfusion
  - 15.6.1. Indications
  - 15.6.2. Complications of Exchange Transfusion
- 15.7. Red Blood Cells Transfusion in Children Older than 4 Months of Age
  - 15.7.1. Anemia in Hemato-Oncology Patients
  - 15.7.2. Management of Massive Hemorrhage in Pediatrics
- 15.8. Platelet Transfusion in Children Older than 4 Months of Age
  - 15.8.1. Therapeutic Platelet Transfusion Thresholds
- 15.9. Plasma Transfusion in Children Older than 4 Months of Age
  - 15.9.1. Acute Hemorrhage in Hemophiliac Patients
- 15.10. Immunoglobulin Administration
  - 15.10.1. Update on ITP Treatment in Pediatrics

**Module 16. Transfusion and Blood Saving Strategies in Special Situations**

- 16.1. Woman of Childbearing Age
  - 16.1.1. Transfusion Considerations
  - 16.1.2. Alloantibodies with Gestational Significance
- 16.2. Pregnant Woman
  - 16.2.1. Anemia and Pregnancy
  - 16.2.2. Use of Erythropoietin in Pregnancy
- 16.3. Tolerance of Anemia in Elderly Patients
  - 16.3.1. Most Frequent Causes
  - 16.3.2. Factors that Lead to Hemorrhage in Elderly Patients
- 16.4. Transfusion in Elderly Patients
  - 16.4.1. Transfusion Thresholds
  - 16.4.2. Risk of Water Overload and Acute Pulmonary Edema
- 16.5. Anemia in Patients With Ischemic Heart Disease and Heart Failure
  - 16.5.1. Mechanisms of Anemia in Patients with Cardiomyopathy
  - 16.5.2. Use of Erythropoietic Agents
  - 16.5.3. Transfusion Thresholds
- 16.6. Anemia in Chronic Kidney Disease Patients
  - 16.6.1. Mechanisms of Anemia in Chronic Kidney Disease Patients
  - 16.6.2. Use of Erythropoietic Agents
- 16.7. Anemia in the Emergency Department
  - 16.7.1. Diagnosis of Anemia in the Emergency Department
  - 16.7.2. Management of Anemia in the Emergency Department
- 16.8. Massive and/or Life-Threatening Hemorrhage in the Emergency Department
  - 16.8.1. Resuscitation and Stabilization
  - 16.8.2. Hemorrhage Control
- 16.9. Immune Thrombocytopenic Purpura in Adults
  - 16.9.1. Management in the Emergency Department
- 16.10. Acute Complications in Sickle Cell Anemia Patients
  - 16.10.1. Management of Acute Complications
  - 16.10.2. Recommendations for Blood Transfusion

**Module 17. Processing of Blood Components**

- 17.1. Obtaining Blood Components by Whole Blood Fractionation
  - 17.1.1. Fractionation of Whole Blood and Apheresis Procedures
  - 17.1.2. Anticoagulant and Preservative Solutions
  - 17.1.3. Leukodepletion of Blood Components
  - 17.1.4. Cryoprecipitate
- 17.2. Apheresis Procedures in Blood Component Donation
  - 17.2.1. Mono and Multicomponent Apheresis
  - 17.2.2. Apheresis Machines
- 17.3. Quality Requirements for Blood and Blood Components
  - 17.3.1. The Transfusion Accreditation Committee's Hemotherapy Standards
- 17.4. Whole Blood and Red Blood Cell Concentrates
  - 17.4.1. Indications for Whole Blood and Red Blood Cell Concentrate
  - 17.4.2. Modifications of Red Blood Cell Components: Washing, Aliquoting, Irradiation and Inactivation of Pathogens
- 17.5. Therapeutic Platelet Units
  - 17.5.1. Indications for Platelet Transfusion
  - 17.5.2. Modifications of Platelet Components: Washing, Aliquoting, Irradiation and Inactivation of Pathogens, Reconstituted Whole Blood
- 17.6. Plasma as a Blood Component
  - 17.6.1. Transfusion and Industrial Use
  - 17.6.2. The Production of Plasma Derivatives
  - 17.6.3. The Case of Hyperimmune Plasma and its Use in the SARS-CoV-2 Pandemic
- 17.7. Cryopreservation of Blood Components
  - 17.7.1. Cryopreservation Techniques Applied to Blood Components
  - 17.7.2. The Use of Cryopreserved Blood Components
- 17.8. Irradiation of Blood Components
  - 17.8.1. Sources Used for Irradiation
  - 17.8.2. Blood Components that Can Be Irradiated
  - 17.8.3. Indications for Irradiated Blood Components
- 17.9. Pathogen Inactivation Techniques in Blood Components
  - 17.9.1. Utility of Blood Components
- 17.10. Labeling of Blood Components

## Module 18. Therapeutic Apheresis

- 18.1. Apheresis Techniques
  - 18.1.1. Techniques and Types of Replacement
  - 18.1.2. Apheresis in Pediatrics
- 18.2. Complications and Adverse Effects
  - 18.2.1. Complications Related to the Technique
  - 18.2.2. Adverse Effects Related to the Anticoagulant Used and Venous Accesses
  - 18.2.3. Adverse Effects Related to the Replenishment Volume
- 18.3. General Apheresis Procedure
  - 18.3.1. Types of Venous Access
- 18.4. Patient Assessment for Apheresis
  - 18.4.1. Donor/Patient Assessment
  - 18.4.2. Informed Consent
- 18.5. Therapeutic Apheresis in Hematology: Progenitor Transplantation
  - 18.5.1. Apheresis for Hematopoietic Progenitor Donation, for Autologous and Allogeneic Transplantation
  - 18.5.2. Donor Lymphocyte Apheresis
- 18.6. Therapeutic Apheresis in Hematology: Plasma Exchange
  - 18.6.1. Thrombotic Thrombocytopenic Purpura
- 18.7. Therapeutic Apheresis in Hematology: Other Situations
  - 18.7.1. Erythroapheresis
  - 18.7.2. Leukoapheresis
  - 18.7.3. Platelet Apheresis
- 18.8. Therapeutic Apheresis in Solid Organ Rejection
  - 18.8.1. Indications for Solid Organ Transplants
- 18.9. Therapeutic Apheresis in Neurological Pathology
  - 18.9.1. Indications in Neurological Pathology
- 18.10. Therapeutic Apheresis in Renal Pathology
  - 18.10.1. Indications in Neurological Pathology

## Module 19. Blood Saving Strategies in the Preoperative Setting

- 19.1. Preoperative Anemia
  - 19.1.1. Diagnostic Algorithm
- 19.2. Iron Deficiency Anemia
  - 19.2.1. Use of Intravenous Iron
- 19.3. Anemia in Oncology Patients
  - 19.3.1. Anemia Mechanisms
- 19.4. Erythropoietin
  - 19.4.1. Erythropoietin Indications
- 19.5. Hemorrhagic Risk Assessment
  - 19.5.1. Patient Factors
  - 19.5.2. Procedural Factors
- 19.6. Thrombotic Risk Assessment
  - 19.6.1. Patient Factors
  - 19.6.2. Procedural Factors
- 19.7. Bridge Therapy and Pre-Operative Recommendations
  - 19.7.1. Dicoumarinics
  - 19.7.2. Direct Acting Anticoagulants
- 19.8. Preoperative Recommendations for Antiplatelet Therapy
  - 19.8.1. Low Hemorrhagic Risk Surgery
  - 19.8.2. High Hemorrhagic Risk Surgery
- 19.9. Preoperative Recommendations in Patients with Congenital Coagulopathies
  - 19.9.1. Low Hemorrhagic Risk Surgeries
  - 19.9.2. High Hemorrhagic Risk Surgeries

**Module 20. Blood Saving Strategies in the Intraoperative Setting**

- 20.1. Identification and Monitoring of Intraoperative Hemostasis Disorders
- 20.2. Anesthetic and Surgical Techniques to Reduce Intraoperative Bleeding
  - 20.2.1. Intraoperative Fluid Therapy
- 20.3. Administration of Prohemostats
  - 20.3.1. Plasma and Platelet Administration
  - 20.3.2. Administration of Antifibrinolytics
  - 20.3.3. Fibrinogen and Cryoprecipitates
  - 20.3.4. Prothrombin Complex Concentrate
- 20.4. Autologous Transfusion Methods
  - 20.4.1. Acute Normovolemic Hemodilution
  - 20.4.2. Autologous Blood Transfusion
- 20.5. Intraoperative Blood Component Transfusion
  - 20.5.1. Transfusion Thresholds
- 20.6. Cardiac Surgery
  - 20.6.1. Fluid Therapy in Cardiac Surgery
  - 20.6.2. Transfusion Algorithms and Transfusion Thresholds
- 20.7. Pediatric and Obstetric Surgery
  - 20.7.1. Obstetric Hemorrhage
  - 20.7.2. Transfusion Recommendations for Neonates in the Intraoperative Setting
- 20.8. Orthopedic Surgery and Traumatology
  - 20.8.1. Risks for Transfusion in Orthopedic Surgery Patient
- 20.9. Refusal of Allogeneic Blood Transfusion
  - 20.9.1. Alternatives to Allogeneic Blood Transfusion in Patients Refusing Transfusion
- 20.10. Acute Hemorrhage and Massive Transfusion
  - 20.10.1. Main Intraoperative Causes
  - 20.10.2. Strategies in Antiplatelet/Anticoagulated Patients and Emergency Surgery

**Module 21. Blood Saving Strategies in the Postoperative and Critical Care Setting**

- 21.1. Mechanisms of Anemia in Critical Patients
  - 21.1.1. Etiopathogenesis.
- 21.2. Mechanisms of Coagulopathy in Critical Patients
  - 21.2.1. Disseminated Intravascular Coagulation
- 21.3. Management of Anticoagulation and Antithrombotic Prophylaxis
  - 21.3.1. Thromboprophylaxis
  - 21.3.2. Anticoagulation
- 21.4. Early Diagnosis and Treatment of Infections
  - 21.4.1. Strategies for Early Diagnosis of Infections and Prevention of Sepsis
- 21.5. Optimization of Anemia Tolerance
  - 21.5.1. Use of Erythropoietic Agents in Critically Ill Patients
- 21.6. Transfusion Thresholds in Critically Ill Patients
  - 21.6.1. "Do-Not-Do" Practices in the Use of Blood Components
- 21.7. Controlled Hypotension
  - 21.7.1. Indications
  - 21.7.2. Physiological Response of the Organism
- 21.8. Digestive Hemorrhage
  - 21.8.1. Managing Hepatopathic Patients
  - 21.8.2. Gastrointestinal Bleeding Prophylaxis
- 21.9. Intracranial Hemorrhage Management
  - 21.9.1. Use of Prohemostatic Agents
- 21.10. Management and Indications of the Extracorporeal Membrane Oxygenation System (ECMO)
  - 21.10.1. Venoarterial ECMO
  - 21.10.2. Venovenous ECMO
  - 21.10.3. Transfusion Thresholds



# 07 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.



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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*





At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.







# 07 Certificate

The Advanced Master's Degree in Clinical Hematology guarantees, in addition to the most rigorous and up-to-date education, access to a Advanced Master's Degree issued by TECH Technological University.



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*Successfully complete this program  
and receive your university diploma  
without travel or laborious paperwork”*



This **Advanced Master's Degree in Clinical Hematology** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Advanced Master's Degree** issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Advanced Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Advanced Master's Degree in Clinical Hematology**

Official N° of hours: **3,000 h.**





## Advanced Master's Degree Clinical Hematology

- » Modality: **online**
- » Duration: **2 years**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

# Advanced Master's Degree Clinical Hematology

